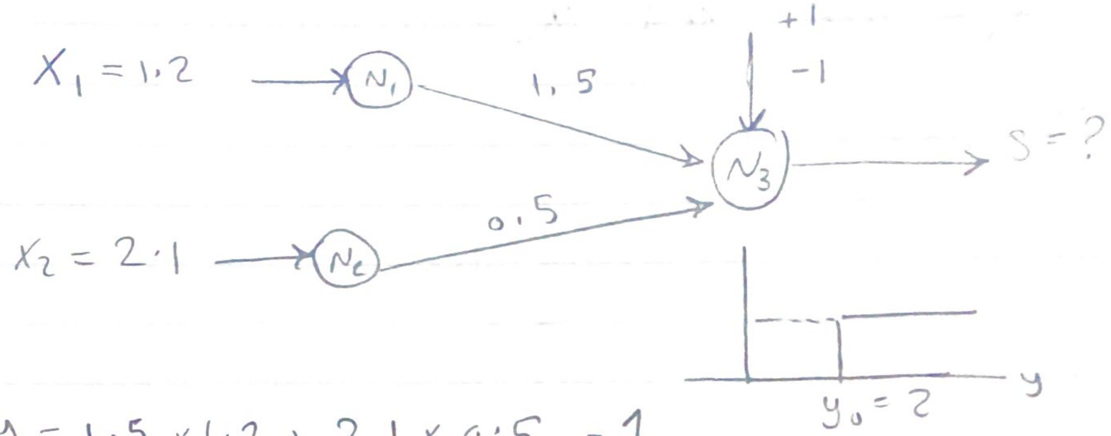
15/10/2016 السبت م.محمد سكشن 3

Sheet 2

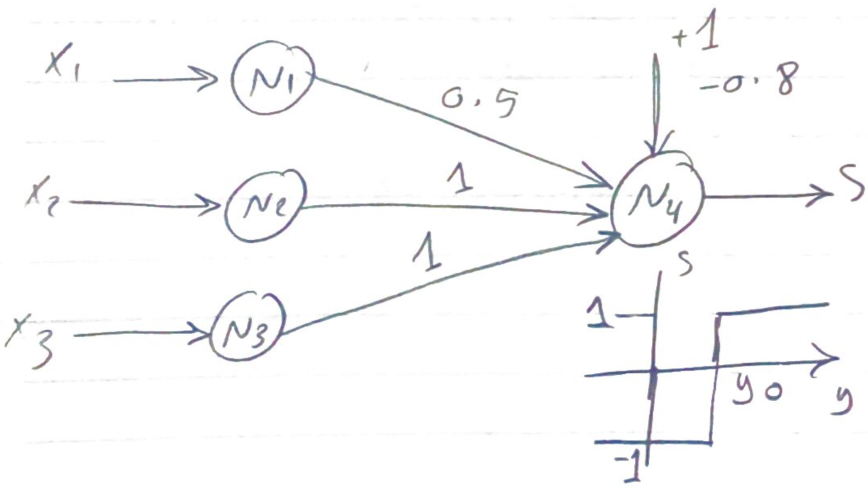
1



$y = 1.5 * 1.2 + 2.1 * 0.5 - 1$

$= 1.85 < 2 \Longrightarrow \boxed{S = 0}$

2



X_1	X_2	X_3	S
0.8	0.4	1.5	-1
0.9	1.2	1.4	-1
1.7	0.6	1.9	1

get y_0

$y = \frac{1}{2} * X_1 + X_2 + X_3 - 0.8$

① $X_1 = 0.8$; $X_2 = 0.4$; $X_3 = 1.5 \longrightarrow S = -1$

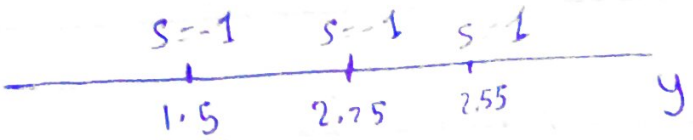
$y = 1.5$

② $X_1 = 0.9$; $X_2 = 1.2$; $X_3 = 1.4 \longrightarrow S = -1$

$y = 2.25$

③ $X_1 = 1.7$; $X_2 = 0.6$ $X_3 = 1.9 \longrightarrow S = 1$

$y = 2.55$

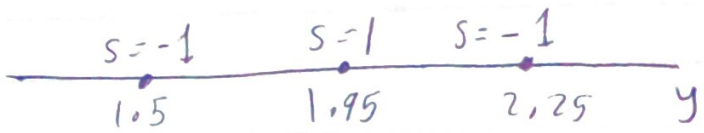


$\therefore y_0 > 2.25$ and $y_0 < 2.55$

Let $y_0 = 2.5$

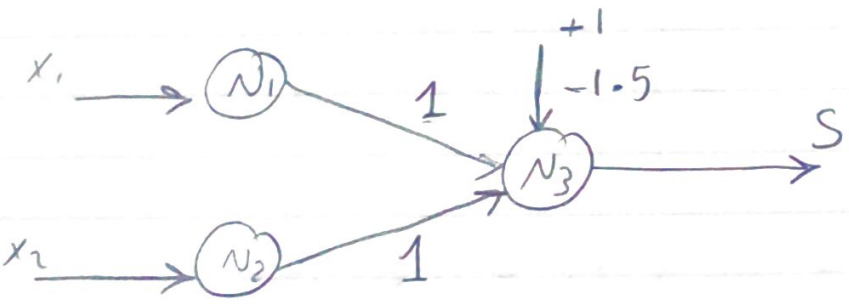
[3] Change in Sample 3 only

$y = 1.95$



we cannot get y_0 such that bipolar threshold solves this problem, we need to change the weights. (Non Linear because of weights)

[4] Design AND using Binary threshold



[5] Design OR using weights in [4] with Shifted Binary threshold

$y = x_1 + x_2 - 1.5$

① $x_1 = x_2 = 0 \longrightarrow S = 0$

$y = -1.5$

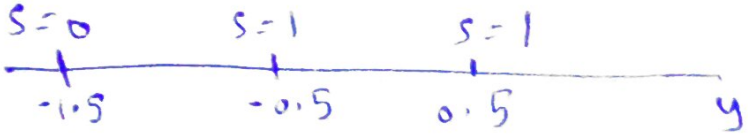
② $x_1 = 0, x_2 = 1 \longrightarrow S = 1$

$y = -.5$

③ $y = -.5$ ④ $y = 0.5$

x_1	x_2	S
0	0	0
0	1	1
1	0	1
1	1	1

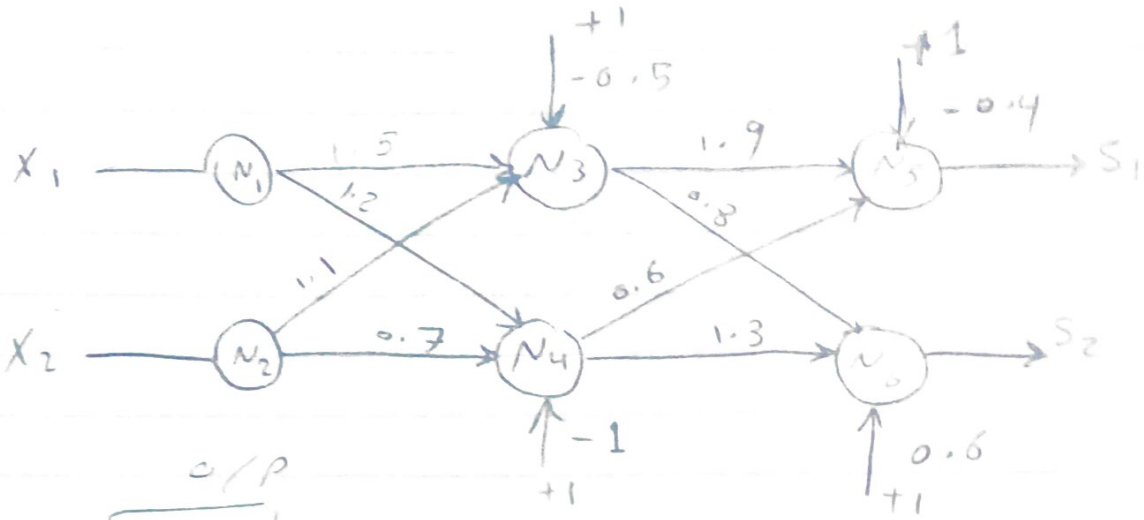
[2]



$-1.5 < y_0 < -0.5$

Let $y_0 = -1$

6



i/p	o/p
$x_1 = 1$, $x_2 = 2$	$S_1 = 1$, $S_2 = -1$

(N_3, N_4) Binary threshold
(N_5, N_6) shifted Binary thresh

get y_0 for S_1, S_2

① $y_3 = 1.5 x_1 + 1.1 x_2 - 0.5$

$y_3 = 3.2 \longrightarrow f(y_3) = 1$

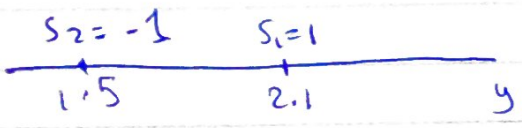
② $y_4 = 1.2 x_1 + 0.7 x_2 + -1 = 1.6$

$f(y_4) = 1$

③ $y_5 = 1.9 + 0.6 - 0.4 = 2.1$; $S_1 = 1$

$y_0 < 2.1$ ①

④ $y_6 = 0.8 + 1.3 - 0.6 = 1.5$; $S_1 = -1$



$y_0 > 1.5$ ②

Let $y_0 = 1.8$